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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/757,364	01/08/2001	Albert W. Chan	6136-53650	6620

7590 11/01/2002  
COUDERT BROTHERS  
600 Beach Street  
San Francisco, CA 94109

EXAMINER

HARAN, JOHN T

ART UNIT	PAPER NUMBER
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1733

9

DATE MAILED: 11/01/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/757,364

Applicant(s)

CHAN ET AL.

Examiner

John T. Haran

Art Unit

1733

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 October 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 17-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 16 is/are rejected.
- 7) ☒ Claim(s) 14 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered. Specifically, the applicable section of *Microelectronics Packaging Handbook* referred to in page 8 of the specification was not submitted in an IDS.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the edges" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "said polymer fluxing agent" in line 1. There is insufficient antecedent basis for this limitation in the claim. It appears that either the claim should depend from claim 9 rather than claim 6 or "said polymer fluxing agent" should be - - said solder material fluxing agent - -.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1-2 are rejected under 35 U.S.C. 102(a) as being anticipated by Murakami (U.S. Patent 6,133,066).

Murakami discloses a method for attaching a semiconductor element to a circuit board wherein a semiconductor element (planar substrate) with conductive electrode bumps is aligned with a circuit board (planar substrate) having conductive mounting pads so that the bumps and mounting pads are aligned, then a sealing epoxy resin (liquid polymeric material), which acts as an underfill, is supplied to the circuit board, then the semiconductor element is pressed to spread the resin outward such that the bumps contact the mounting pads, and then the resin is cured (Column 4, line 50 to Column 5, line 11; Figures 1G-1H). Murakami clearly anticipates claims 1 and 2.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1733

7. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami (U.S. Patent 6,133,066).

Murakami is silent towards the polymeric material being dispensed on a plurality of dies present on the circuit board or towards the circuit board having a planar surface area of at least about 36 square inches. It is well known and conventional in the art for circuit boards to have a planar surface of at least about 36 square inches and for circuit boards to have a plurality of semiconductor components attached to it and to apply sealing resin to each die area to receive a component. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use well known and conventional techniques in the art such as using a circuit board with a planar surface area of at least about 36 square inches or to apply a plurality of semiconductor components to a circuit board and provide sealing resin to each die area to receive a component in the method of Murakami.

Murakami is also silent towards the electrode bumps being made of solder with a fluxing agent however it is notoriously well known and conventional for electrode bumps to be made of solder and for the solder bumps to contain a solder material fluxing agent. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the electrode bumps be solder bumps that contain a solder material fluxing agent in the method of Murakami.

Art Unit: 1733

8. Claims 7-9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami (U.S. Patent 6,133,066) as applied to claims 1-6 above, and further in view of Wang (U.S. Patent 6,476,676) or Konarski et al (U.S. Patent 6,458,472).

Murakami is silent towards the underfill epoxy sealing resin containing a polymer fluxing agent. It is well known and conventional for underfill epoxy sealing resins to contain polymer fluxing agents and for the underfill material to comprise from about 15% by weight to 70% by weight of a polymeric resin, about 15% to 70% by weight of a curing agent, and from 0.10% to 20% by weight of fluxing agent, as shown for example in Wang (See Examples) and Konarski et al (Column 4, lines 26-43). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use well known and conventional underfill resin in the method of Murakami, as modified above.

9. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami (U.S. Patent 6,133,066) as applied to claims 1-6 above, and further in view of Wang (U.S. Patent 6,476,676) or Konarski et al (U.S. Patent 6,458,472) as applied to claims 7-9 above, and further in view of Stefanowski (U.S. Patent 5,334,260).

It is well known and conventional to use phenylacids such as phenylacetic acid in fluxing agents, as shown for example in Stefanowski (Column 3, lines 20-28). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use well known and conventional fluxing agents in the method of Murakami, as modified above.

10. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al (U.S. Patent 6,207,475).

Lin et al teaches the well known and conventional method of attaching a chip to a substrate wherein a liquid polymeric material, which acts as an underfill, is dispensed on the substrate which has electrically conductive contact pads, a chip with electrically conductive solder bumps is then positioned over the substrate is pressed against the liquid polymeric material, causing it to spread and allowing the solder bumps of the chip to contact the contact pads on the substrate and then the assembly is heated to cure the liquid polymer material (Column 2, lines 10-40).

It is noted that the claim 1 requires dispensing a liquid polymeric material between a conducting first surface and a conducting second surface and then pressing to spread the liquid polymeric material, however the method of Lin et al, dispensing the adhesive on the substrate, then positioning a chip over the substrate, and then pressing the chip to spread the adhesive is an alternative expedient and functional equivalent. The disclosure on page 6 indicates that the upper substrate does not touch the liquid polymeric material until it is lowered against it just as in the method of Lin et al. One skilled in the art would have readily appreciated that the two methods are obvious one over the other. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an obvious alternate expedient and functional equivalent such as dispensing the liquid polymeric material between the chip and the substrate in the method of Lin et al.

Regarding claims 3 and 4, Lin et al are silent towards the polymeric material being dispensed on a plurality of dies present on the circuit board or towards the circuit board having a planar surface area of at least about 36 square inches. It is well known and conventional in the art for circuit boards to have a planar surface of at least about 36 square inches and for circuit boards to have a plurality of chips attached to it and to apply sealing resin to each die area to receive a component. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use well known and conventional techniques in the art such as using a circuit board with a planar surface area of at least about 36 square inches or to apply a plurality of chips to a circuit board and provide sealing resin to each die area to receive a component in the method of Lin et al, as modified above.

Regarding claim 6, Lin et al are also silent towards the electrode bumps being made of solder with a fluxing agent however it is notoriously well known and conventional for electrode bumps to be made of solder and for the solder bumps to contain a solder material fluxing agent. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the electrode bumps be solder bumps that contain a solder material fluxing agent in the method of Lin et al, as modified above.

11. Claims 7-9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al (U.S. Patent 6,207,475) as applied to claims 1-6 above, and further in view of Wang (U.S. Patent 6,476,676) or Konarski et al (U.S. Patent 6,458,472).

Lin et al are silent towards the underfill epoxy sealing resin containing a polymer fluxing agent. It is well known and conventional for underfill epoxy sealing resins to contain polymer fluxing agents and for the underfill material to comprise from about 15% by weight to 70% by weight of a polymeric resin, about 15% to 70% by weight of a curing agent, and from 0.10% to 20% by weight of fluxing agent, as shown for example in Wang (See Examples) and Konarski et al (Column 4, lines 26-43). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use well known and conventional underfill resin in the method of Lin et al, as modified above.

12. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al (U.S. Patent 6,207,475) as applied to claims 1-6 above, and further in view of Wang (U.S. Patent 6,476,676) or Konarski et al (U.S. Patent 6,458,472) as applied to claims 7-9 above, and further in view of Stefanowski (U.S. Patent 5,334,260).

It is well known and conventional to use phenylacids such as phenylacetic acid in fluxing agents, as shown for example in Stefanowski (Column 3, lines 20-28). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use well known and conventional fluxing agents in the method of Lin et al, as modified above.

***Allowable Subject Matter***

13. Claims 14 and 15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter:

The prior art fails to suggest a fluxing agent comprising a beta phenylacrylic acid and a beta phenylhydroxyacrylic acid. Absent any art showing a fluxing agent comprising both types of acids the subject matter of claims 14 and 15 are considered allowable.


***Conclusion***

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John T. Haran** whose telephone number is **(703) 305-0052**. The examiner can normally be reached on M-Th (8 - 5) and alternate Fridays.

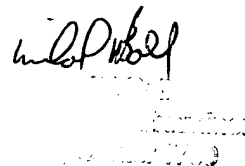
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael W. Ball can be reached on (703) 308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Art Unit: 1733

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

  
John T. Haran

October 30, 2002

  
The signature is handwritten and appears to be "info P. 10/31/02". Below the signature is a circular stamp with the text "RECEIVED" and "OCT 31 2002".